ABSTRACT

Methods and apparatus for combustion of a hydrocarbon fuel in a combustion chamber of a furnace or boiler are presented, the combustion normally using only air as an oxidant, part of the air entering the combustion chamber through one or more burners, and a remaining portion of air entering the combustion chamber at a plurality of locations downstream of the burners. The methods comprise injecting oxygen-enriched gas through a plurality of lances into the combustion chamber at a plurality of downstream locations, the oxygen-enriched gas injected at a velocity ranging from subsonic to supersonic, and the oxygen-enriched gas being present in an amount sufficient to provide an oxygen concentration of no more than 2% on a volume basis greater than when air is used alone as oxidant.